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## Old Age: A Public Health Problem

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THE invitation to address this distinguished group was as unexpected as it was appreciated. I am not quite sure whether I was asked to discuss some phase of geriatrics because I am especially interested in the subject, or because I have lived long enough to have first-hand knowledge of the aging process.

Soon after I had chosen my subject for this talk, a letter from a friend who has been in public health work for many years stated that he was preparing a paper on "Health Problems of an Aging Population." He and I have promised to exchange manuscripts, in order that we may compare our methods of approach to the subject. One advantage I have over him is that, after I have aired my views on the ways in which health officers should deal with the problems of old age, no one can reproach me for not practising what I preach. It is too late for me to enter public health work—except to the extent that every conscientious private practitioner and medical teacher should engage in striving to improve the health of the public as well as of his private patients.

The tremendous increase in the proportion of older people in our population has brought about a corresponding emphasis upon their medical care. A changed concept of medical practice has resulted. Forty years ago the treatment of acute infectious diseases occupied most of the doctor's time and energy. In the best hospitals whole wards were devoted to typhoid fever. Among children the dreaded "second summer," with its diarrheas and dysenteries, took a fearful toll. Diphtheria, whooping cough, and pneumonia made the winter season almost equally dreaded. Tuberculosis then led all the causes of death by a wide margin.

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The treatment of infectious diseases was so absorbing that little time was left for even attempting to prevent their occurrence. Still less time was available to spend in examining individuals who were well enough to walk to one's office, and in advising them about their diet or their general hygiene.

The health officers—at first few and far between, then in larger and larger numbers—have taken the lead in health education and in the control of communicable diseases by such preventive measures as quarantine, immunization, sewage disposal, purification of water supplies, and milk and meat inspection. Countless thousands of lives have been saved thereby. To the credit of the private practitioners, they have for the most part cooperated with the health officers, even at the risk of losing much of their practice.

Now that so many more people than ever before are living out their Biblically allotted span, new problems are presented to the medical profession as a whole. Thus far, most of the literature on the subject of geriatrics has come from men in private practice; yet old age is indeed a public health problem, and is being recognized as such. In the letter already referred to, my friend, the health officer, said: "I have felt for some time that public health departments should shift a considerable amount of emphasis from general communicable disease control, since most of our common communicable diseases are now fairly well under control, and that greater emphasis should be placed on problems of an aging population, among which most of our morbidity and mortality are occurring." Then he continued—and please remember that this is a direct quotation from a health officer, and not my own words—"I feel that most of our public health departments have gotten pretty much into a rut and are still doing most of the things which were so necessary twenty or twenty-five years ago, but which have been reduced in importance more recently."

#### GERIATRIC PROBLEMS WHICH ARE ALSO PUBLIC HEALTH PROBLEMS

Let us consider some of the public health problems offered by older people.

##### *Infectious Diseases*

Some years ago two children in a prominent Winston-Salem family contracted active pulmonary tuberculosis from an old colored servant who worked around the house and kept the yard. He had had a cough for years, which had been diagnosed as "phthisic" (a common name for asthma or chronic bronchitis). After the disease was recognized in the children, the old servant's sputum was found to be teeming with tubercle bacilli. Fortunately, both children recovered, thanks chiefly to the devoted care of their mother; but not all youngsters who contract the disease are so fortunate. From a public health standpoint, it is perhaps unfortunate that chronic pulmonary tuberculosis in the aged may make little difference in the natural life expectancy, although its victims may spray the vicinity with bacilli-laden sputum. Certainly, in a search for carriers of tuberculosis, members of the older generation should never be overlooked. It is hardly necessary to add that, regardless of his feelings, the old person with an open case of tuberculosis must be gotten away from the rest of the family.

Typhoid fever is no longer the menace it was; yet in February and March,

1942, sixty high school students in Honolulu contracted typhoid fever from a carrier who was a food handler in a high school cafeteria. The father of the food handler was also a typhoid carrier. These two are reminiscent of the famous "Typhoid Mary" Mallon.

It should not be forgotten that the immunity from a childhood attack of whooping cough as well as other children's diseases may disappear later in life. More than one grandmother has contracted whooping cough from a grandchild. The so-called "sympathetic" or "nurse's cough" may be a second attack of pertussis, which can be transmitted to others. From the public health point of view, the older members of a family should be protected from the younger ones with pertussis, and *vice versa*. One of the finest family doctors who ever practised in Winston-Salem had a typical case of pertussis when he was about sixty years old, and his whoops could be heard from afar. He continued his practice, however, and would not admit until the attack was over that he "might have had a touch of whooping cough." Heaven only knows how many children he infected with the disease.

Abraham Lincoln, when 51, wrote a friend that one of his children had scarlet fever, and that "I have a headache and a sore throat upon me now, inducing me to suspect that I have an inferior type of the same thing." One may wonder how often the sore throat of an older person who has no rash may convey the streptococcus of scarlet fever to others.

There are many other infectious diseases which can be carried by older people, who are often more difficult to handle than children. They are apt to be more careless and indifferent, and are likely to have less respect for the germ theory.

### *The Degenerative Diseases*

The fact that so many of the infections have been controlled, or virtually abolished, puts the degenerative diseases far ahead in morbidity and mortality statistics. It has long seemed to me that one of the chief functions of a health officer is educational. He, far more than the private practitioner, is looked upon by the public as the spokesman for the medical profession. He need have no inhibitions in giving health information over the radio and in the newspaper, whereas the private practitioner, like Caesar's wife, must be above suspicion—in this case, the suspicion of unethical self-advertising. In this matter of educating—or, perhaps better, informing—the public, the prevention of infectious diseases has been stressed. It seems to me that now, when the degenerative diseases are coming to be of far greater importance, the health officer might well give more emphasis to preventive geriatrics—or what Dr. M. W. Thewlis calls "preclinical medicine." Information about the measures that may be taken to postpone the wearing-out process could be disseminated not only through the mediums of the press and radio, but in mental hygiene clinics for older people, such as the Old Age Counseling Center in San Francisco. These will be referred to later on.

Heart disease is now universally recognized as the "Captain of the Men of Death." It is true that as yet we have no means of protecting the population

by quarantine or immunization from diseases of the heart and blood vessels. Even though our knowledge is pitifully inadequate, however, we are at least able to tell the people something of the importance of protecting children from throat infections which may usher in an attack of rheumatic fever. We also know enough of the etiology of hypertensive cardiovascular disease to warn the mature business and professional man against overweight and against too long and too intense application to work, at the expense of rest and recreation.

Another degenerative disease concerning which the public needs a great deal of information is arthritis. Health officers can render a great service by disseminating the true facts about this disease and refuting many false beliefs. While a certain measure of hypertrophic arthritis is to be expected by everyone who lives long enough, it seldom cripples its victim as does the rheumatoid variety, which shows a marked preference for younger individuals. The belief is widespread, however, that old age is peculiarly a target for "rheumatism," and that eventual confinement to a wheel chair or bed is inevitable in all types of this disease. Another widespread piece of misinformation fostered by advertising in the newspapers, the religious papers, over the radio, and—perhaps worst of all—in such popular magazines as *The Reader's Digest* and *Time*, is that the same remedies which are used for rheumatoid arthritis may also be used to advantage in the senile form.

The public—and, it must be admitted, many private physicians—should be informed of the difference in the two types of arthritis, and given to understand that there is no cause for undue anxiety if an old man's spine feels rusty after he sits or lies for any length of time. Furthermore, the public should be told that, notwithstanding the endorsement of such eminent scientists as Paul de Kruif in such reputable medical publications as *The Reader's Digest*, irradiated ergosterol, even under a trade name, is of doubtful value in rheumatoid arthritis, and of absolutely no value in the hypertrophic variety; indeed, it may actually be harmful.

While it must be admitted that there is an enormous amount yet to be learned about arthritis, we are equally certain that fatigue, chilling, and faulty posture play as great a part in its causation as do the more widely publicized focal infections. Another important factor in the etiology of hypertrophic arthritis is obesity. These few facts which we do know concerning the prevention of arthritis should be widely disseminated.

Another service that health officers could render is to give the laity correct information about the endocrines. The estrogens have established their place securely in helping women over the climacteric period when the going is unusually rough. The male hormones have a much more limited field of usefulness, although there are conditions in which they seem helpful. Something might be done to counteract the overenthusiastic endorsement of a pseudo-scientist who portrays the wonderful effects they have produced in himself and in a race horse. It would be better to advise the aging man to accept the philosophical viewpoint of Plato's Sophocles, who felt that in his old age he "had escaped from a mad and furious master."



### Cancer

Malignant neoplasms are inevitably, because of their greater incidence, attracting more and more attention. In the field of cancer control the health officer has an excellent opportunity to employ his educational talents. The point has been made by a general practitioner that cancer propaganda should place more emphasis on the *curability* of cancer and less on the mortality statistics. It has been my experience as a family doctor that for every patient with cancer who came to me as a result of the propaganda used thus far, I have seen at least fifty nervous individuals who were frightened unnecessarily. A deep-rooted cancerphobia may be more difficult to eradicate than an actual cancer.

If the public could be educated to the idea of having complete physical examinations at regular intervals, the mortality from cancer, as well as from many of the degenerative diseases, could be substantially reduced. An even more direct attack on the cancer problem is the establishment of tumor clinics, where modern diagnostic methods make possible the discovery of cancer in its earliest and most easily curable stage.

### The Mental Changes of Age

One of the most important geriatric conditions—the mental changes of age—lies at least partially in the domain of preventive medicine. While the dementias and emotional problems of senility may be caused by largely unavoidable organic disease, such as cerebral arteriosclerosis, they are often the result of infections, notably syphilis, and of vitamin deficiencies, such as pellagra.

*Syphilis* is on the way out. While much credit for this fact is due to improved methods of treatment and to the marriage laws passed by most states, the most important single factor is probably the intensive campaign waged by health departments everywhere, from the national agency down to the humblest county official. The results obtained by the health departments are due largely to the pitiless publicity which made the so-called social diseases a household word. You may have heard the story of the social worker who left with an underprivileged family a booklet on sex hygiene. On her next visit, she inquired whether the booklet had been read. After some hesitancy, one of the younger members of the family said that they had not read all of it, but that in looking through it they had found two lovely names for Sister's twin baby girl: Syphilis and Gonorrhea.

Older people are unusually susceptible to the *deficiency diseases*. The loss of teeth, unless they are replaced by well-fitting dentures, makes it difficult to chew green vegetables, fruits, and meats. The tendency to substitute easily masticated carbohydrates is accentuated by the natural childishness of the old, and also perhaps by the necessity for economy. Poorly balanced diets are by no means confined to the "ill-fed, ill-clothed, ill-housed third" of our population, however. One of the most brilliant internists that our section of the United States ever produced was known often to eat as many as five slices of pie at a meal, disregarding the substantial main dishes. He was crippled with arthritis for years before he died, and—although he was a pioneer in the study of pel-

lagra, and one of the first to recognize the importance of diet in its etiology and treatment—he developed a full-blown case of pellagra shortly before he died.

Health officers have a splendid opportunity to emphasize correct eating habits, and the importance of a balanced diet. The eradication of deficiency diseases would do much to lower the incidence of many physical as well as mental ills, and to lengthen the productive period of life.

The institutional care of those afflicted with the mental deterioration of senility is an economic, sociologic, and public health problem which presents numerous difficulties from various angles. The institutions for the care of our mentally afflicted citizens are too often political footballs, and the allowances dealt out by legislatures are seldom adequate for the proper care of the inmates. The medical men who staff such institutions are almost always overworked, and are naturally anxious to use their limited facilities for the patients who can be most benefited. For this reason, they may object to the admission of those who are disabled only by the ravages of time and for whom there is no hope of improvement. When such people are cared for at home, they require the full-time attention of one or more members of the family, and these amateur attendants must be taken out of circulation so far as earning power is concerned. The custodial care of an old man or woman may mean the difference between a family's being independent and being on relief. Furthermore, the presence of an aged and querulous parent in the home may bring about friction between the natural child and the son-in-law or daughter-in-law. When grandchildren are present, the domestic atmosphere may become even more surcharged with tension. More than one divorce has resulted because a child thought that his (or her) first duty was to his parent rather than to his mate.

While the family doctor is usually the one to whom people turn when they are faced with the problem of securing custodial care for an aged dependent, the public health nurse or social worker is often in a strategic position to offer help when such a situation arises.

#### RETIREMENT

A question that has become of utmost importance within recent years is that of retirement: the age at which a man should step aside and let a younger one take his place. The Army and Navy, as well as most industries and educational institutions, have adopted a fixed age for retirement. Some sort of pension is usually provided to soften the economic blow of retirement, but little is done to mitigate the psychologic trauma.

There are excellent arguments both for and against the fixed retirement age. In favor of it is the fact that few individuals are capable of evaluating their own mental status, especially whether they have the flexibility and resilience needed in a teacher or research worker. It saves the administrative head the embarrassment of having to ask for the resignation of a man who has obviously outlived his usefulness. It saves the individual himself the humiliation of overhearing himself referred to as an old fogey, or of becoming the butt of practical jokes because of his increasing absent-mindedness. In industry, the

older worker's reaction time is apt to be slower, and his output less than that of a younger man. A heart attack or cerebral hemorrhage occurring in a locomotive engineer, or in the driver of a loaded bus or truck, might result in the loss of life and valuable property.

On the other hand, the process of physical and mental deterioration is hastened in many old people as a result of the psychologic shock that comes with the realization that their usefulness is over. In addition to the difficult problem of keeping them occupied, their families may then be burdened with the actual expense of their upkeep. Though the social security act was intended to make provision for those who have passed the retirement age, it rarely provides a sufficient amount—certainly not in these days of inflated prices—for a decent living. Unless workers are allowed to continue to produce as long as they are able, the burden of caring for the unemployed will become intolerably heavy. Eventually every worker may find himself saddled with a veritable Old Man of the Sea; and even greatly increased earnings will not suffice to carry the load.

During the recent World War the lesson should have been learned by industry that many older workers are capable of doing their jobs effectively when far past the usually accepted retirement age. They are usually more dependable than the younger workers, and are not so apt to lose time from work because of hangovers from week-end parties. While the accidents that may occur as the result of cerebral hemorrhages or heart attacks are always given wide publicity, they are in reality very few and far between. The accident rate among older workers is, I believe, lower than among younger employees.

In the professions, there is no question but that the increased judgment that comes with experience and maturity is an asset—certainly until definite organic changes in the brain interfere with the proper functioning of the mind.

It should be comparatively easy for the psychologists to devise a method of testing the mental agility of older people. Such a test should determine whether an individual's mental muscles are flexible enough for him to carry on after he has reached the chronological dead-line. It is possible, also, that such a test might eliminate some employees—perhaps even some public health officers—long before the fixed age of retirement.

Think what the world would have missed had a retirement age even of 70 been universally enforced. Gladstone was Prime Minister of England at 83; Benjamin Franklin helped frame the Constitution of the United States at 80; Oliver Wendell Holmes retired from the Supreme Court bench at 91; Henry Ford, when past 80, took up the presidency of the Ford Motor Company for a second time after his son's death; and Alonzo Stagg was named the "Football Man of the Year" at 81. Dr. Lillian J. Martin learned to drive an automobile when she was 76 years old, and at the same age founded the Old Age Center in San Francisco, "where she received aged people not as patients but as students." She continued to direct it until her death at 91. To multiply these examples would be tedious, but I would like to add one more that will be familiar to every health officer. After the late Dr. Milton J. Rosenau had to retire from the Harvard Medical School at 67, he came to the University of North Caro-

lina, and there in the remaining ten years of his life built one of the greatest schools of public health in America. Truly, Harvard's loss was North Carolina's gain.

Public health officers could render a great service to society by leading a campaign for extending the useful life of the worker, whether in business, industry, or the professions. Another approach to a solution of the *psychologic* problem of retirement, at least, would be to teach the aging individual to prepare for retirement by cultivating enough outside interests to keep his mind occupied when he is no longer employed. Still another possible approach would be the establishment of counseling centers for older people similar to the ones founded by Dr. Lillian J. Martin in San Francisco in 1929, and by Dr. George Lawton in New York. An important function of such centers would be to provide interests and possibly employment for persons who have been retired from their jobs.

#### CONCLUSION

In conclusion, I would like to emphasize that private practitioners are coming more and more to share a common objective with public health officers. This might be termed the long-range view of medicine—that of preventing sickness and prolonging life—as distinguished from the short-range view of curing—or trying to cure—acute diseases. It is worth repeating, for the sake of emphasis, that in this program the public health officer has the privilege and the responsibility of acting as the spokesman for the medical profession.

#### SUMMARY

1. The great increase in the proportion of older people in our population, and the reduction of contagious diseases, have brought about a changed concept of medical practice.
2. Among the public health problems of old age are the infectious diseases, degenerative diseases, cancer, and mental change.
3. The retirement age should not be based on a rigid chronologic yardstick, but upon psychologic tests.
4. The public health officer is the spokesman for the medical profession, and can accomplish much in the field of preventive geriatrics by disseminating health information to the public.

# The Indispensable Local Health Department

HAVEN EMERSON, M.D.

*New York*

WE are all concerned with the novelty, the broad scope, the vision and ambition of the new World Health Organization. We on this continent shall share in the benefits of any rising standards of health which may be achieved in other less fortunate countries and in the abatement of disease among backward peoples in impoverished lands.

Traditionally and with loyalty and patriotism, we have long respected the health functions and services of our national (Federal or Dominion) governments on both sides of our precious border of permanent peace. We need and are protected in matters of land, maritime and aerial guarantee and sanitation in the interest of freedom of commerce in products and travel of our people. We expect and rely upon the consultative, and research and educational support of our central governments and in matters of standards of foods, drugs and biologicals. We of the United States constantly hope for a single Federal health authority.

At the next level of our structure of representative self-government, whether of province or state, we have well-developed health organizations which have made abundant contributions to the progress of public opinion and support of health services appropriate to the needs of each such great subdivision of the nation. Statute laws, sanitary rules and regulations, central records and analysis of vital statistics, laboratory diagnosis, engineering guidance and consultation, financial and personnel assistance have all been provided to some degree by the intermediate, state and provincial health departments.

However, and in spite of the laudable and somewhat formidable functions and authorities at the international, national and state levels, it is the health services delivered almost from door to door, person to person, day by day in the communities of our people that produce direct, prompt, visible results understood as an obligation of local government. Performance and accomplishment in the work of official health agencies will continue to be measured at the point of ultimate or retail delivery, where the person, the household, the cross-roads village, the township, city or county receives, or lacks, the simple thrifty protection, guidance and direction in healthful living, by doctors, nurses, sanitarians, dentists, statisticians, health educators, employed by local government, paid for chiefly if not wholly by local tax resources and responsive to the needs of the people they live among and know as the physician to the sick knows his patients and families.

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*Edited from notes used at the Conference of State and Provincial Health Authorities of North America, held in the Château Frontenac, Quebec, May 20-22, 1947, in conjunction with the annual meeting of the Canadian Public Health Association.*

Health in the global sense may be front-page news, but health on the home-site, in the kitchen, school, shop, farm, factory is what the science of preventive medicine will be judged by as a purchasable social commodity. There is nothing more intimate in the relation of government to the people who have created it, than that which is built out of the local health department, where the staff of this executive branch of civil affairs is employed to translate the modern knowledge of human biology into the terms and manner of living and enjoying life, and a livelihood free from the handicaps of preventable disease.

There can be no substance or reality in health organization at the state, national and international levels unless the base, the foundation structure, the essential functioning element in all public health service is developed, accepted, and supported at the local or community level for each jurisdiction of local government of an appropriate size to employ the group of essential professional and assistant personnel to do a creditable job.

With this conviction in mind, a half dozen members of the American Public Health Association in July, 1942, looked critically at the health services of our people and found them spotty, here good, there absent, unreasonably inadequate in amount, distribution and quality. Such a challenge, especially in war time, demanded an effective answer, which was made in the usual way of our people by a critical review of the existing state of affairs, an analysis of the causes of such failures of organization and service as were disclosed, and recommendations which would improve matters.

The record of the studies, the findings and the proposed solution is to be found in "Health Units for the Nation", published in 1945 by The Commonwealth Fund for the American Public Health Association and offering a pattern for local health organization to cover all units of population and the entire continental area of U.S.A.

Briefly, it was found that about 41,000,000 of the people of our states are living in communities which lack full-time modern local health departments for providing even the six basic health services considered indispensable. This large mass of population had either no local health services at all or a mere skeleton department of health with a part-time health officer, sometimes a physician and in many instances a non-medical person, in charge.

A primary cause of such inadequacy was the small size of many population units authorized by state law to maintain local government and establish health departments.

It appears that there are approximately 155,000 local government jurisdictions which may if they wish set up local health departments in the U.S. There are, in fact, some 18,500 such local health departments. There are 3,070 counties in the 48 states. In the opinion of the Committee on Local Health Units of the American Public Health Association, not more than 1,200 local health departments are needed to cover the nation.

In September, 1946, there was held a conference on local units under the auspices of the University of Michigan at Ann Arbor, attended by each state health officer and his administrative director of local health services, an attendance of 110 persons who spent a week concentrating upon the correction



of our present failures and the removal of the causes which had led to such confusion, duplication, and incompetence as was acknowledged. The entire proceedings of this conference were published as a supplement to the *American Journal of Public Health* in the January, 1947, issue, and these addresses and discussions constitute a valuable expression of professional judgment and opinion not elsewhere to be found so well expressed.

The members of the conference agreed as to the soundness of the plan for total national coverage proposed, they accepted the facts reported as to the degree of failure of present local health services and committed themselves to undertake the remedy.

Since then there has been formed an organization of directors of local health administration of state health departments and their initial meeting at Topeka, Kansas, in April, 1947, is a good omen of the seriousness and competence of their effort to see that each state will tackle its problem promptly and systematically so that no least community within its borders shall be without full-time medically directed local health service. Substantial progress is being recorded in many states across the continent, especially in California, Washington, Kansas, Nebraska, Illinois, Michigan, and New York.

There are three major hurdles to be removed or overcome in achieving a complete and wholly sound structure of local health departments in the United States. First, and always, there is public ignorance. The people do not yet know what the sciences of preventive medicine and human biology can do for them, their survival, their happiness, their form of government. They do not know the cost of modern training of professional personnel and the economy of trained leadership and direction of health departments. Their thinking is of the horse-and-buggy era rather than that of the gas engine and the aeroplane.

Secondly, we are short of the trained physicians, nurses, sanitarians and accessory personnel indispensable for a modern local full-time health department.

Thirdly, there is commonly an insufficient appropriation of tax monies to do a creditable job at the local level.

What are needed in many parts of the States, and I believe also in some parts of Canada, so that we may move swiftly forward to cover our people and areas with local health jurisdictions of a competent kind are at least the following five resources.

1. Permissive state laws, authorizing the creation of county-wide, city-county and multi-county units of local health jurisdiction embracing populations preferably of not less than 50,000 persons each.
2. Termination of employment of part-time, untrained officers of health and the appointment only of medical officers of health, professionally trained and with practical experience, to direct each local health department, and at salaries equivalent to the average net income of good internists or surgeons of the vicinity.
3. A requirement expressed in state law or local ordinance that the functions of the local health department shall include at least the six standard activities essential for public health services, and that these be conducted at a

credible level of performance by persons qualified under civil service or merit system of employment.

The six standard functions referred to are:

Vital Statistics, natality, morbidity and mortality records, and their analysis, interpretation and publication.

Communicable Disease Control, including tuberculosis and venereal disease.

Environmental Sanitation, including occupational conditions and control of food processing and serving.

Public Health Laboratory Services.

Maternity, Infant and Child Health.

Health Education, so far as not covered in the schools and colleges.

4. Tax support of at least \$1.00 per caput for local health services and preferably \$2.00. At least 50 per cent of tax support should be from local sources, grants of state funds to supplement local tax monies if necessary, and Federal aid to be not more than 25 per cent of total cost and preferably to be devoted to additional or exceptional services rather than for basic health activities.

5. The creation of a Community Health Council for each local health jurisdiction, organized to share in state-wide as well as local movements to promote health services by government at taxpayers' expense.

The facts today are that we have left the most important structure of health administration seriously uncompleted.

This has been the result of a smallness of conception of the functions and benefits of local government and a tendency to look to the State and Federal governments to do the job properly, although best undertaken at the local level.

Larger community units and full-time trained professional personnel, adequate in number in proportion to the population and suitably paid, will be necessary.

For a population unit of 50,000 there will be needed to do a competent local health job the following 16 full-time employees and some part-time clinical service from physicians and dentists:

One medical officer of health.

One sanitary or public health engineer.

One non-professional sanitary assistant.

Ten public health nurses, one of them to be of supervisory grade.

Three office, secretarial or clerical personnel.

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Local government that fails to serve its people by providing the benefits of human biology and preventive medicine is a shabby travesty, a failure of democracy.

Health services are at their most efficient level when they are for personal, family, neighborhood use, and are supplied by a professional staff responsible to local government, its taxpayers and voting residents.

Local government is the instrument of modern democratic, representative society through which the sciences of human existence can bring their benefits

to the person and to the community at the least cost and with maximum appropriateness.

There is no unit of local government in the United States that cannot better afford to spend at least \$1.00 on competent local health services than to pay out the same or larger sums for articles and conveniences of small worth which have no enduring value.

Health can be bought by local government at a lower price than is paid for many of the so-called necessities and satisfactions of life or for such luxuries as alcohol, tobacco, chewing gum, cosmetics, or self-medication with useless or harmful medicines.

The local health department has become an increasingly indispensable function of government because it brings to all who need its services the non-commercial, unselfish contributions of the accumulated treasures of the medical sciences so that life will be broader, deeper, fuller of happiness and safety as well as longer for all persons.

*The  
Canadian Public Health Association*

ANNOUNCES THE

*Thirty-sixth Annual Meeting*

HOTEL VANCOUVER, VANCOUVER, B.C.

MAY 18-20, 1948



*Executive Council Meeting May 17*

## University Affiliation with Health Departments for Developmental and Educational Purposes

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OUR discussion today is concerned with the advisability of collaboration among universities and health departments to promote the more extensive use and fuller development of various health department services—for example, local health units—as teaching and research laboratories. We may begin by considering the following questions: Would not the health department's facilities complement to advantage the university's intramural laboratories and clinics in a research program planned in the interest of perfecting administrative practices and professional methods? Are not such complementary facilities needed in rounding out the university's educational resources for the pre-service and in-service training of medical and public health personnel? Would not the administrator and the educator find it to their mutual advantage to play interlocking roles in promoting a three-dimensional program providing for research to advance knowledge, for teaching to assure proficient workers, and for administration in which new knowledge would be applied? While the educator and administrator would obviously play major and minor roles, respectively, in the educational and administrative phases of the program, the participation of each in research should possibly occupy a coordinate or intermediary position.

Through contact with field work, the educator becomes more intimately acquainted with social needs and with the administrator's plans for meeting these needs, and by virtue of such understanding the educator is in a more favourable position (a) to collaborate as an adviser or participant in studies required for the guidance of administrators, (b) to adapt university courses of instruction to the end that public health and medical students may be more adequately prepared to meet their future responsibilities, and (c) to expand the university's curriculum to include courses of instruction for the preparation of new types of personnel that may be needed to meet the demands of expanding medical care and public health programs. Furthermore, the educator's collaboration should be helpful to the administrator in raising standards of medical care and public health practices—important considerations to the university not only from the standpoint of fulfilling more adequately its teaching responsibilities, but also from the viewpoint of opening up opportunities for productive research. It is to be anticipated that further development of team work between health depart-

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ments and universities would greatly facilitate the recruitment and placement of public health and medical personnel. From such collaboration there should result a more suitable distribution of personnel geographically, especially as relates to rural community needs, and a more equitable proportionment professionally with respect to general medical practitioners and the various medical specialists, since field contacts of students and teachers will appraise for them more realistically the needs and opportunities for service. From such reflections as these it is felt that it may be timely to consider whether or not further collaboration would work to the mutual advantage of administrator and educator in the fulfillment of their respective interrelated responsibilities, as well as to the advantage and benefit of the public as the recipient of their services.

#### FACILITIES FOR FIELD TRAINING

There are to be found in Canada a wide variety of field facilities which might lend themselves, to excellent advantage, to a program for providing practical experiences for public health trainees, medical students, and technical aides associated with public health and medical services. The following enumeration of available field training opportunities will suffice to illustrate facilities which await further recognition or fuller utilization: (1) medical preceptorships with outstanding general practitioners serving in both urban and rural areas—an apprenticeship type of training earlier in vogue and now again beginning to reappear in its proper interrelationship with university instruction—and in addition assigneeships to selected group clinics and to specialists in medical practice; (2) an extension of medical internships to suitable hospitals outside the large cities and not now being utilized—such institutions to be affiliated with faculties of medicine as auxiliary training and teaching adjuncts; (3) medical and public health traineeships with city health departments, to provide experience in administration, in communicable disease services, including hospitalization, in venereal disease clinics and field follow-up services, the tuberculosis program, children's services, public health nursing, mental hygiene, oral hygiene, sanitary services, food and dairy supervision, and other similar functions carried out by urban health organizations; (4) medical and public health traineeships with full-time district health units, in order to provide experience with rural and smaller community health services; (5) assigneeships with central health organizations (a) for the purpose of familiarizing public health trainees and medical students with the organization and functions of official and voluntary national and provincial health services in the interests of promoting better teamwork between the future medical practitioners or health officials and these services, and (b) to provide specialized experience in national and provincial divisional services, suited to the trainees' future responsibilities; and (6) assignments of medical and public health students with such institutions as tuberculosis sanatoria, psychiatric hospitals, and cancer institutes, provision being made for the apportionment of time between institutional and field extension programs. Other organizations, institutions, and services operating in the province should also be utilized to provide practical field training, including: (a) the Victorian Order of Nurses, for training of public health nurses; (b) suitable laboratories and

X-ray departments of hospitals, for the preparation of laboratory and X-ray technicians; (c) associations for hospital services, such as the Blue Cross Plan for Hospital Care, as well as corresponding organizations for medical care services, to meet the student's need to become acquainted with the practical application of the principles of medical economics; and (d) selected hospitals, to give students insight into the organizational set-up, the administrative practices, and the policies of such institutions.

The utilization of field facilities for training purposes may best be regarded, perhaps, as a joint university-health department responsibility, it being to the mutual advantage of these two organizations to assist each other to the fullest extent possible. It probably would be unnecessarily difficult for universities to make use of field facilities for strengthening their teaching and developmental services without the sympathetic collaboration of health administrators, hospital superintendents, and directors of other institutions and services concerned. In addition to providing entree for the university to the facilities in general of central and local health departments, operational interrelationships in particular should be provided, with either one local health unit comprising both urban and rural coverage, or with two separate units, one urban and the other rural—such units to be within convenient distance of the university so as to serve as readily accessible teaching laboratories and workshops for both teachers and students. Furthermore, in tying in operational field services with universities, it should be clearly understood that all field services are not to be utilized by all students, but rather that the variety of services available will be apportioned on the basis of the trainees' requirements, depending upon needs ranging from orientation to the varying degrees of practical experience particular students may require to fit them specifically for certain posts.

#### NEED FOR DEVELOPMENTAL SERVICES

With relatively few exceptions, health administrators as yet regard their sphere of activity as largely or exclusively executive or applicational in nature, rather than inclusive also of research, as a part of the regular program which they administer. While this prevailing attitude would seem to apply more strictly to scientific investigations underlying professional practices, it holds true largely also of administrative experimentation as an accepted method in guiding organizational growth. In contrast to this attitude of health departments, our great universities fortunately are assuming more and more responsibility in the research field.

In the words of Lyman Bryson, Professor of Education, Columbia University, "A part of education and one of the major duties of the university is to add to the sum of human knowledge." Sound as this point of view may be, however, the scope of university research as applied to medicine and public health would appear as yet to be out of balance with respect to the preponderance of intramural investigations, as compared with field studies. While there is need for the latter to catch up with the former, both these aspects of research endeavor should be more fully matured and more effectively integrated. It would seem reasonable to assume that if, in addition to intramural investigations on



which the professional growth in the medical and public health fields is dependent, a concurrent extramural program of administrative research is carried out, further benefit will accrue to health administrators and medical practitioners, because such an extension of the scientific method should, it would seem, assure sound organizational and administrative growth, upon which efficient and fuller use of available knowledge is dependent.

Traditionally the formulation and the application of administrative plans have been left to the judgment of administrators—the safeguard being the adoption of plans which conform to established administrative principles. Nevertheless, even with such a precaution, the continued acceptance of such practices in today's complex society may be questioned. Indeed, it is a puzzling phenomenon to those of scientific background that public health administrators will so often accept new organizational schemes for immediate and wide application without first subjecting them to an adequate experimental trial on a limited basis to determine their suitability, innocuousness, or even harmfulness. This lack of caution on the part of administrators in adopting untried administrative procedures presents a sharp contrast to the commendable care with which new professional techniques or biological products are tested in the laboratory or clinic before they are accepted for general use—although in this realm too our propensities to "take a chance" make us vulnerable at times to justifiable criticism. The double standard, as it were, which calls for a stricter discipline in scientific proof before acceptance of professional as distinguished from administrative innovations, must be recognized as existing. The remedy, however, is not too obvious, especially from the standpoint of providing for field studies with suitable controls.

A course of action which would seem readily applicable as a preliminary step would be to regard the whole medical and public health operational field as a vast research laboratory calling for the collaboration of the educator with the administrator in its exploitation from the standpoint of administrative research. This approach would be concerned with making the most of the trial-and-error method—an approach that would fit in well with existing trends, calling for little more than additional cooperative planning and a greater degree of painstaking appraisal. Another approach that would seem practicable of application too would be to subject new administrative proposals to a limited field trial before giving them universal application. The administrative innovations would be formulated, and during the probational field test would be followed closely by administrators and educators working together. Such approaches would afford opportunities to field-test controversial administrative schemes, thereby preventing premature adoption by proponents and undue delay of acceptance by opponents—the decision being based on the results of the field trial. The more revolutionary the theory, the more painstaking and thorough should be the field appraisal. We may have implicit confidence as to the merits of a projected plan; we may feel that the time required for an adequate field test would be too great and that the delay is unjustified because of the urgency of the need for action or because circumstances are favourable for the immediate initiation of the new procedure. But all such considerations may well be regarded as ques-

tionable if not specious arguments for the justification of the wide application of untested administrative procedures, or the adoption of administrative practices successfully operated in other countries. Considering the number and the wide geographic distribution of Canadian universities, typifying the various socio-political regions of the country as a whole, it would seem reasonable to assume that if all, or the majority of, these institutions with medical or closely related faculties were to collaborate with administrators, the output of administrative research would be sufficient to ensure sound progressive developments in medical care and public health practices. Indeed, one of the significant contributions which administrators and educators with scientific background may logically be expected to make to the social services in general is a further exemplification of the merits of scientific discipline as applied in field experimentation in the first instance, prerequisite to the acceptance of organizational innovations on a wide scale.

While health departments may not be justified in disclaiming indefinitely responsibility for independent research, such an attitude need not continue to be an obstacle to applied research, providing the health department opens its doors to collaboration with universities. To this end, therefore, it would seem to behoove health departments to make their field facilities available generally, and to cooperate in setting up, in particular, readily accessible rural and urban health units as affiliates of universities, to provide immediately available workshops for developmental purposes—such field laboratories to be properly inter-related from a functional standpoint with the universities' intramural laboratories and clinical facilities.

#### CONSIDERATIONS RELATING TO MEDICAL SCHOOLS

Dr. Livingston Farrand has said, "No longer is our concept of health limited to mere absence of illness . . . in our present view health is a condition of well-being which embraces physical, mental, and emotional hygiene, and controls to a very large extent personal and social behaviour." (1) Dr. Harry A. Wann has pointed out also that "The predominant purpose of medicine has come to be not only the prevention of disease but the development of a positive, robust, virile health"; and with reference to mental health he has stated further that "Mental hygiene is now endeavouring not only to prevent mental diseases and personal and social disintegration, but, also, discover ways and means of developing in each individual a well integrated personality which can face reality with courage, with zest, and with success." (2) Furthermore, the sponsors of "social medicine" are advocating that more attention be given to the importance of improving man's health by attacking the environmental causes of disease. Eminent among these, Dr. John A. Ryle, professor of social medicine at Oxford, calls for the consideration of man "as a person and a member of a family and of much larger social groups, with his health and sickness intimately bound up with the conditions of his life and work." Dr. John B. Grant has epitomized as well as anyone perhaps the objectives of public health and medical services in these words, "The promotion of positive health for each individual to achieve and maintain optimum health of mind and body." (3) And the same author has

predicted, "Once the essential environmental and infectious disease services have been completed, health will not further progress to a satisfactory level until preventive and curative medicine are brought under a single coordinated administration . . ." According to Dr. Grant, "The attainment of a high standard of physical and mental health is largely the eventual responsibility of medical practitioners, second, public health having gone so far in the effective control of preventive diseases, should next tackle the problem of making generally available the skilled medical services necessary to maintain and promote mental and physical health."

These points of view will suffice to focus attention on medical educators and practitioners of medicine as occupying strategic positions as public health participants—at present largely or wholly a functional relationship with health departments, but with the prospect of organizational consolidation with these departments, should medical and public health services join forces in the future. Indeed, the evolution of medical practice may be expected to result in the establishment of offensive preventive and defensive curative practices as counterparts of a complete medical service—preventive medicine being essentially applied physiology on the one hand, and curative medicine being applied pathology on the other. As to emphasis, the past of medicine has been largely concerned with curative medicine, the present may be marking the introduction of a transition period, and the future may give rise to an era of a unified service in which preventive medicine will have gained a coordinated position with or ascendancy over curative medicine.

It is accepted generally that a significant advance was made in medical education when the university teaching hospital became affiliated with the medical school. The study of diseases at the bedside supplements realistically the medical school's lecture room and laboratory training. Clinical work, begun in the outpatient department, and gradually extended to the hospital wards during the students' undergraduate days, is rounded out after graduation by a hospital internship—a postgraduate period of practical experience now firmly and formally established as an essential aspect of the course of training for the practice of curative medicine. Furthermore, the orientation that the medical trainee receives in hospitals as a student and interne assures effectively his tie-in with the community hospital when he becomes a medical practitioner.

Reasoning by analogy, it would seem plausible that a similar great advance might be made in medical education if teaching local health units were to become affiliated with medical schools. The training received at the various public health clinics, the insight obtained into field services of public health nurses and sanitarians, familiarity with the application of the principles of epidemiology in the control of communicable diseases, the influence of social and economic conditions on the health of individuals as observed in the field, the family and occupational approach to medical and health problems, etc., should supplement realistically the medical student's lectures and laboratory training with respect to his preparation as a practitioner of preventive as well as curative medicine. Such practical public health experiences, gradually introduced during the students' undergraduate days by assignments in affiliated health units and rounded out by

a health department internship arranged for the summertime or as a co-part of a hospital internship, may in due course be regarded as an essential provision in the preparation of medical students for the practice of preventive medicine. Indeed, this public health orientation and training experience should effectively assure the doctor's tie-in with community health departments when he becomes a medical practitioner, that is, should fit him for fuller and more intelligent use of the community's public health facilities than exists at present, and better utilization of the services of his public health associates, especially the public health nurses, in raising the standards of preventive medical practices.

While it is perhaps true to say there is a fair degree of uniformity of opinion that medical service will not be developed as two separate, independent branches—curative and preventive—but as a unified profession with complementary aspects (a point of view which has not so far as I know been established conclusively on the basis of field trials), there is little likelihood of error in assuming that preventive medicine is still far behind curative medicine in its scientific development. This is a general statement, and does not apply equally well to all fields of medical practice, as for example, the practice of paediatrics. But in general, preventive medical practice in age groups beyond the infant period falls short of professional standards attained in curative medicine. Indeed, it would seem that a life extension service as a medical measure is being called into question, or may even be held in disrepute by some physicians on the ground that such practices promote an increase in the number of hypochondriacs. Granting the wisdom of weighing carefully misgivings of moment which may be advanced in opposition to "periodic health checks", it is to be pointed out also that continual professional supervision developed from the standpoint of a practice of applied physiology, directed towards the family as the medical-practice unit, and on the basis of a medical group service, might be worthy of experimental field trials as a basis for acceptance or rejection. Can such a practice be successfully perfected professionally and organizationally to obviate substandard states of health and frank disease by professional guidance with respect to healthful living, early detection and correction of deviations from the normal, the administration of prophylactic agents or immunizing antigens, etc? Might not the incidence of those with morbid anxiety about health be reduced through the confidence engendered in such individuals when they share their responsibility for health with competent practitioners of preventive medicine? Whatever our personal attitudes may be about such searching questions, not many will question that there is an upward trend in the practice of preventive medicine and an increasing public demand for it—a pre-warning of the medical practice to come, sufficient, perhaps, to warrant the initiation of programs of research now. Obviously such basic studies should be facilitated by access to local health units affiliated with the university.

Since this is not the place to discuss the organization of a research program in the field of preventive medicine, suffice it to suggest that a department of human physiology and biochemistry, in association with departments of clinical medicine, should be in a position to contribute to basic knowledge needed to put the practice of preventive medicine on a sounder scientific basis or on a

more useful plane of service. Indeed, such group investigation might prove to be comparable in its success to the cooperation of departments of pathology and bacteriology with clinicians which has placed curative medicine on its present scientific basis. As we have said, curative medicine is based upon pathology, and preventive medicine is in a comparable sense based upon human physiology. The medical examination, as carried out in curative medicine, has for its aim a diagnosis prerequisite to prescribing a course of treatment, whereas the health examination has for its objective a prognosis, which serves as a basis for outlining the measures that may be called for in safeguarding and promoting the health of individuals. The one is concerned with disclosing disease processes, whereas the other, in addition to detecting early deviations from the normal, is concerned with appraisal of whether or not the functionings of the organs of the body are within physiological limits. Life-long longitudinal medical records of individuals are needed to fulfill a role in the advancement of preventive medicine comparable to the roles that autopsy, laboratory findings, and clinical history have played and continue to play in the promotion of curative medicine. Research is needed—research in basic human physiology, tied in with the work of the premedical and clinical departments of the university; and this cooperative research should be facilitated through the utilization of field workshops provided by university affiliations with health departments.

#### CONSIDERATIONS RELATING TO SCHOOLS OF HYGIENE OR PUBLIC HEALTH

Schools of hygiene or public health, like schools of medicine, must have the collaboration of central health departments and local health units in order to provide adequate teaching and research opportunities through the combined use of intramural and field facilities; and it is important that these schools as well as the schools of medicine have direct working arrangements with local urban and rural health services—a principle recognized and implemented for a number of schools of hygiene and public health. While the preparation of medical students for their role as practitioners of preventive medicine is the responsibility of medical schools—an area of educational responsibility each medical school should develop fully through its department of hygiene and social medicine—the postgraduate training of students for public health careers is the major teaching duty of the special faculties of schools of hygiene. With respect to medical public health personnel, the schools of hygiene continue essentially from where the medical schools' services leave off, being concerned with the preparation of health administrators, heads and staff members of divisional services such as public health laboratories and departments of vital statistics, epidemiology, maternal and child hygiene, and so forth.

The responsibility of the medical school with regard to public health posts which call for occupants with a medical background is twofold: it must furnish the prerequisite undergraduate medical training for such personnel and it should cooperate with public health administrators and directors of schools of hygiene in the recruitment of medical public health personnel. Such assistance might well include provision for a probational period in a university-affiliated local health unit for candidates for public health posts—a prerequisite training



period which would serve as a screening process in the selection of such candidates and which also would provide for public health orientation, to condition selectees for the fuller utilization of the school of hygiene opportunities.

Following the academic postgraduate training of prospective public health personnel at the school of hygiene, there should be arranged a continuation of their practical training, now as public health internes in departments of health. Accordingly, it would seem advisable to establish a suitable functional interrelationship among national and regional schools of public health, departments of hygiene and social medicine of medical schools, and provincial deputy ministers of health, directed towards the undergraduate preparation of medical public health trainees, their recruitment, their public health academic training, and their subsequent postgraduate internships—a responsibility of coordination which could best be facilitated, perhaps, by the employment by schools of hygiene, separately or jointly, of a field representative. While it is true that a start has been made in this direction in Canada, what has been accomplished, commendable as it is, represents perhaps little more than the rudimentary beginning of what will yet be realized and recognized in future years as essential in the preparation of public health personnel.

Mention has been made of the need for local health units affiliated with schools of hygiene. While it is to be recognized that the utility of these units as teaching and research field laboratories is limited in scope, they should with proper maturation provide invaluable field workshops. The several members of the faculties of the schools of hygiene, in cooperation with the staffs of these units, would have a unique opportunity to build here operational services in their respective fields of interest, to typify exemplary services, modified or adjusted to conform with attending circumstances. Not only would such health units demonstrate to public health students what should be accomplished administratively under a particular set of circumstances, but in addition the superior administrative plans worked out for the units would serve a wider interest as patterns to be followed by the provinces and medical schools for local health services in general and affiliated university units in particular. Apart from such considerations, however, the development of these local units, it is felt, would be eminently worthwhile in itself as exercises in administrative research for the faculties of schools of hygiene. While it would probably be true, since the schools would work through the unit staffs, that the participation of the faculties in the organization and administration of the units would of necessity be that of collaborators, nevertheless, having a hand in applied public health work would be a step in meeting a need for the utilization of the educators's services in the field of applied research. No special further comment is called for with respect to the utilization of these affiliated health units in other research fields except to point out the commendable progress being made to these ends by faculties of schools of hygiene at the present time.

National and regional schools of hygiene cannot rely alone on local affiliated rural and urban health units to meet their needs with respect to teaching and research. The capacity of these few units is too limited. In addition, operational interrelationships are needed with other local, provincial, and national health



services. Through such association, the inadequate capacity of affiliated local health services can be expanded to meet extramural needs of the schools of hygiene. Through such a tie-in with health departments in general, opportunities for research, especially in the administrative field, for consultant services in the specialized field of public health, etc., should be greatly stimulated and facilitated. In brief, university affiliation with health departments for developmental and educational purposes should initiate cooperative interrelationships between administrator and educator which will lead to significant contributions mutually beneficial to departments of health and universities.

Time does not permit including discussions of the development of similar relationships between departments of health and the other university schools vitally concerned, such as schools of public health nursing, schools of dentistry, and schools of social welfare work. In this connection, suffice it to say that the approaches made by medical schools and schools of hygiene will exemplify the needs and the advantages of such interrelationships, and they should serve as a guide for other schools in the task of working out cooperative programs.

#### SUMMARY

In presenting considerations pertaining to university affiliations with departments of health for teaching and investigative purposes, types of facilities available in Canada for providing field teaching programs in public health were enumerated, and the needs for investigational field services were examined. The subject under discussion was developed in particular with reference to medical schools and schools of hygiene; time did not permit discussion of closely related university services, such as school of public health nursing, schools of dentistry, or schools of social work. The point of view was expressed that universities should make judicious use of health and medical field facilities in general, as well as university-affiliated local health units in particular, in order to provide amply for their teaching and research requirements. The collaboration of health administrators, hospital administrators, and medical practitioners on the one hand, with medical and public health educators on the other, was considered as a means of realizing the advantages of a coordinated, integrated service embracing the three-dimensional program of research, teaching, and administration. Attention was also directed towards the implementation of applied research, that is, the utilization of the "scientific method" as a tool and discipline in guiding the growth of public health and medical care services. "The scientific method", in the words of Stuart Chase, "is concerned with how things *do* happen, not how they *ought* to happen. Knowledge of the way things do happen, with no ifs, ands, or buts, allows us to deal more effectively with our environment." (4)

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# Penicillin in Oil and Wax in the Treatment of Gonorrhoea in Women

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ALTHOUGH the time required for the effective treatment of gonorrhoea with aqueous solutions of penicillin may be greatly reduced (1), the advantages of a single injection are sufficient to warrant further trial of penicillin in oil and wax. Since the duration of treatment appears to be an important factor, this series of cases may be of interest because, in one-third of the patients, an attempt was made to determine whether measurable penicillin was still present in the serum some hours after injection. One hundred and thirty-three cases of gonorrhoea were treated at the outdoor department of the Women's College Hospital, Toronto, between August 1, 1945 and July 15, 1946. All were in female patients ranging in age from 14 to 63 years. The majority were uncomplicated cases of about one month's duration in women from 17 to 23 years of age who had had no previous treatment.

## *Dosage and Criteria of Cure*

As treatment, the patients received a single intramuscular injection of 1 cc. containing 200,000 units of calcium penicillin suspended in peanut-oil and 4.8 per cent (W/V) beeswax prepared at the Connaught Medical Research Laboratories. The same amount was used for subsequent additional doses in 19 patients (14 per cent). A single preparation was used throughout the entire study. The local reactions were no more severe than those following penicillin in aqueous solution. In a total of 156 doses there were two instances of mild generalized urticarial reaction on the day after injection. No other untoward reactions were encountered.

The bacteriological investigation was done at the central laboratory of the Department of Health of Ontario. In addition to a direct microscopic examination, a swab from the cervix was streaked immediately on a plate of Peizer's medium which was incubated at 37° C. in 10 per cent carbon dioxide. Characteristic oxidase-producing colonies were examined microscopically using Gram's stain. When the direct microscopic examination was doubtful or negative, such colonies were also subcultured on carbohydrate media. In all cases the clinical diagnosis was confirmed by at least one positive bacteriological report. Following treatment, the patients were required to return for examination at weekly intervals for at least six weeks. In the absence of any evidence of acute pelvic inflammation, patients were considered cured

when they had had six consecutive negative bacteriological examinations after treatment. Patients with some signs of pelvic involvement, such as enlargement of the tubes or ovaries or tenderness in the fornices but without acute inflammation or positive bacteriological findings, were still classified as cured. They were, however, encouraged to report any further complaints. For various reasons some patients returned for examination at irregular intervals.

Since the criteria for cure vary greatly in different clinics, it should be stated that of 30 instances in which there was a positive bacteriological test after treatment, 12 occurred at the first examination (one did not receive the full dose), 4 at the second, 7 at the third, 3 at the fourth, 2 at the fifth and 2 at the sixth. Thus three-quarters of the positive tests occurred in the first 3 weeks. Half the positive tests were associated with a history of further exposure and of 15 such instances, 3 were positive at the second, 5 at the third and the remainder at subsequent examinations. Of the 15 without history of further exposure, all were detected within the first three examinations. On the assumption that the patients with further exposure were reinfectd, three negative examinations might be considered adequate evidence of cure. This would materially alter the evaluation of the success of the treatment.

#### *Penicillin Content of Sera*

In the treatment of gonorrhoea with 50,000 to 100,000 units of penicillin in saline, Farquharson, Greey and Townsend (2) have reported that the duration of treatment is more important than the dose. The number of failures increased when the interval between the first and last dose was decreased to 10 hours and less. For uncomplicated cases in males, they recommended a total dosage of 100,000 units in divided doses at 3-hourly intervals over a period of at least 12 hours. This would be expected to maintain treatment for 15 hours.

A dose of 200,000 units in oil and wax, even if sufficient in amount, cannot be expected to be effective unless an adequate concentration of penicillin in the serum is maintained for a sufficient number of hours. Our previous experience in assessing the effect of oral penicillin in gonorrhoea indicated that a concentration of 0.025 units per cc. of serum appeared to be the critical level below which no successfully treated cases were encountered. In this connection it is of interest that Lankford (3) has reported strains of gonococci to be inhibited *in vitro* by concentrations of from 0.0025 to 0.02 units of penicillin per cc.

Sera obtained from 6 male adults following the injection of penicillin in oil and wax of the same dose of the identical preparation as was used in the present series of cases gave an average of 0.37, 0.16, 0.075 and 0.034 units of penicillin per cc. of serum at intervals of 3, 6, 9 and 12 hours after injection. On this basis, a level of 0.025 units per cc. might be expected at an interval of approximately 15 hours.

Since the patients in this series were not in hospital, only one specimen of serum was requested. This was obtained on the day following treatment at an interval of 14 to 21 hours after the injection of the penicillin. In view of possible deterioration, the sera were tested within a few hours of withdrawal.

Undiluted serum and serial semi-dilutions in 10 per cent horse serum broth, seeded with a sensitive strain of haemolytic streptococcus, were incubated at 37°C. for 18 to 20 hours. The end-point of the titrations was taken to be the highest dilution which completely inhibited growth of the seed culture. The last two inhibiting dilutions and the first which failed to inhibit growth were streaked on blood agar in order to verify the readings. Comparable dilutions of standard penicillin showed complete inhibition of the streptococcus used in these tests by a concentration of 0.025 units per cc. in serum broth. In the absence of serum this strain was sensitive to 0.01 units per cc. Its sensitivity has remained constant since 1944.

Fifty sera from 46 patients were tested. The results are given in Table I. The majority of the sera were from patients whose bacteriological tests remained negative after treatment. Of the 10 patients with positive bacteriological tests, 6 gave a history of further exposure to infection and one did not

TABLE I  
PENICILLIN CONTENT OF 50 SERA AFTER 200,000 UNIT DOSE OF  
PENICILLIN IN OIL AND BEESWAX

Interval After Dose	Penicillin Units per cc. of Serum				Average Titre	Sera Tested	Bacteriological Classification of Patients Whose Sera were Tested			
	0.1	0.05	0.025	<0.025			0.1	0.05	0.025	<0.025
14 hrs.	4	2	1	..	0.075	7	2A 1B 1C ..	1A .. 1C ..	.. 1B .. ..	.. .. .. ..
15 hrs.	..	2	6	1	0.03	9		1A 1B .. ..	5A .. .. 1D	1A .. .. ..
18 hrs.	..	2	9	4	0.02	15		2A .. .. ..	7A 1B 1C ..	3A .. .. 1D
19 hrs.	..	..	6	1	0.02	7	A = 6 neg. (cured) B = <6 neg. (cured?) C = pos. (failed?) D = pos. (failed) * = Unclassified			
20 hrs.	..	..	3	3	0.01	6				
21 hrs.	..	..	..	6	..	6				
Average time in hours	14	16	17½	19½	Total	50				
							33A, 6B, 6C, 4D, 1 unclassified			

receive the full dose of penicillin, so that little information was available as to the effectiveness of treatment in relation to the duration of measurable penicillin in the serum. Of the 33 patients known to be successfully treated, the majority apparently had a measurable amount of penicillin in the serum for 18 hours; none were found to have a measurable amount for less than 14 hours nor more than 20 hours, but the number tested at these intervals was small. Among the cases known to be successfully treated, one had no measurable penicillin in the serum at 15 hours, but not less than 20 out of 21 had measurable penicillin for at least 15 hours and not less than 14 out of 18 for at least 18 hours. Of the four definite failures, one had measurable penicillin at

15 hours, and the remainder, tested at longer intervals, had no measurable penicillin at the time of testing.

For the preparation used, a dose of 200,000 units may be expected to maintain a serum level of 0.025 units per cc. of serum for a period of 15 to 20 hours. No attempt was made to find the peak level in these patients, but from other observations on the identical preparation it would be expected to occur at from 3 to 6 hours and lie between 0.2 and 0.8 units per cc. of serum.

#### *Incidence of Complications*

Pelvic complications developed after treatment with penicillin in six patients (4.5 per cent). These include two with tenderness only in either fornix who both had six negative cultures and were discharged as cured; one with salpingitis and one with a tubo-ovarian abscess, who both defaulted before a second dose could be given; and one in whom bilateral salpingitis and oöphoritis developed after she had been transferred to another institution where she received treatment with aqueous penicillin and was cured. In the sixth patient, after 4 negative bacteriological examinations, one tube and ovary were palpable and tender concurrently with a positive bacteriological test and a history of further exposure after the first dose of penicillin. After a second dose, she had one negative test but failed to return for further observation. The only patient with chronic pelvic involvement prior to treatment with penicillin had been unsuccessfully treated with sulphathiazole at intervals since 1943. Following a single dose of penicillin, which did not prevent the development of a bartholinian abscess, all bacteriological tests were negative although no clinical improvement was apparent in the first 3 weeks. At the last examination some months later, one tube and ovary were still palpable though less tender, and there was a total of 5 negative bacteriological tests. This patient had 0.025 units of penicillin per cc. of serum 19 hours after injection. The incidence of pelvic complications in the same clinic following treatment with sulphathiazole alone was similar: 3 in a series of 77 cases (4 per cent), but the response to further treatment was unsatisfactory. Of three pregnant patients, two were cured with a single dose of penicillin and one required two. No adverse effect of penicillin on pregnancy was evident. The incidence of syphilis in this group, based on clinical and serological examination before and at 3 and 6 months subsequent to treatment, was 10 per cent.

#### *Treatment with Sulphathiazole*

Twenty-seven patients (20 per cent) had from one to six courses of sulphathiazole before treatment with penicillin. Each course consisted of 28 grams given in divided doses in a period of seven days. Of the twenty-seven patients who received sulphathiazole, eighteen, or two-thirds, were considered unsuccessful because of sensitivity, intolerance or persistently positive bacteriological tests. The remainder were presumably reinfected. In some cases there was an interval of months or years between treatment with sulphathiazole and subsequent treatment with penicillin.

The twenty-seven patients who had had sulphathiazole comprised about one-fifth of the total series of 133 patients but they were not evenly distributed

as regards the success or failure of treatment with penicillin, since about one-third of those for whom one dose was insufficient and four-fifths of those whose bacteriological reports were still positive, but who failed to return, were patients who had previously had sulphathiazole.

The patients who were treated with sulphathiazole might be expected to include a large proportion of the less recently infected; they also included three of the seven cases of pelvic involvement. A relatively poor response to treatment in such cases would not be surprising. After a single dose of penicillin, eleven were considered cured, six had only negative tests but less than the required number, and ten had positive tests but in seven cases these occurred late in the observation period and were associated with further exposure to infection. In comparison with the whole group, there are more than twice as many who failed to return for examination, more than twice as many failures, but almost four times as many late failures which may have been due to reinfection. Had three negative tests been considered sufficient, these differences would have been greatly reduced. Half of the patients with preliminary sulphathiazole treatment defaulted sooner or later, as compared with 15 per cent among those who did not have sulphathiazole.

TABLE II

EFFECTIVENESS OF 200,000 UNIT DOSE OF PENICILLIN IN PEANUT OIL AND BEESWAX

Class	Basis of Classification	Number of Patients in Each Class After Each Dose				Total Penicillin Doses	Result % of First Dose	Result % of Total Doses	Final Result for 133 Patients	
		First	Second	Third	Fourth				Number	%
A	6 negative smears and cultures	90	10	2		102	67.7	65.4	105**	78.9
B	1 to 5 neg. smears and cultures	15	3		1	19	11.3	12.2	19	14.3
C	Positive smear or culture associated with further exposure	12	2	1		15	9.0	9.6	3	2.3
D	Positive smear or culture. No history of further exposure	12*	3*			15	9.0	9.6	2	1.5
E	No smears or cultures after last dose	4	1			5	3	3.2	4	3.0
	Total .....	133	19	3	1	156	100	100	133	100
F	No treatment after last positive smear or culture	3***	2			5	2.2	3.2		3.8

All patients in Class F are also listed in Class C or D.

\*One patient did not receive full volume of dose; both had 6 negative tests following the subsequent dose.

\*\*Two patients are included who received sulphathiazole instead of penicillin as the second treatment and one who received aqueous penicillin after transfer to another institution.

\*\*\*One patient received sulphathiazole as a second treatment but remained positive.

With one exception, all patients who had a positive test after the second or third dose had a history of further exposure, either following the first dose or subsequently.



*Evaluation of Results*

In assessing the result of any treatment of gonorrhoea there is likely to be a number of cases in which the outcome is more or less indeterminate. We have attempted to classify them in such a way as to facilitate comparison with other reported cases which may not have been classified on the same basis. The results are given in Table II.

As indicated in the table, class A includes only patients whose clinical cure was confirmed by six negative bacteriological examinations. Classes B and C are indeterminate; in class B all bacteriological tests were negative but insufficient in number, and in class C from one to five negative tests preceded a positive test associated with further exposure. Class D includes only definite failures with positive tests, nearly all at the first examination. For class E no information is available except that there was one failure on clinical grounds. This patient was further treated and cured at another institution.

The effect of a single dose of 200,000 units of calcium penicillin in peanut oil and beeswax may be summarized as follows:

Cures: Six negative tests.....	90	67.7 per cent
Doubtful cures: 3 to 5 negative tests.....	9	15 11.3 per cent
1 to 2 negative tests.....	6	
Doubtful failures: 3 to 5 negative preceding positive test with possible reinfection.....	7	12 9.0 per cent
1 to 2 negative preceding positive test with possible reinfection.....	5	
Failures: Positive test at first to third examination.....	12	9.0 per cent
No tests.....	4	3.0 per cent
	133	100

Twenty-two patients (16 per cent) received additional treatment—three with sulphathiazole. Of the nineteen patients who received additional doses of penicillin in oil and wax, sixteen received only a second dose, two a total of three doses and one a total of four. Over half these additional doses were given when there was further exposure and possible reinfection. Repeated treatment, regardless of further exposure, of patients whose bacteriological tests were positive after the first dose resulted in a material increase in the percentage cured. This suggests that the period of treatment was too short rather than that the concentration of penicillin in the serum was too low or that the gonococci were inaccessible.

Twenty-eight patients (21 per cent) either failed to return for further treatment or did not have the required number of re-examinations. In some instances this was due to the transfer of the patient to an institution elsewhere. Most of these uncompleted cases had only a single dose and in most cases there was no evidence that the treatment was unsuccessful.

A summary of the final result for the series of 133 patients is given below:

Cures: 6 negative tests.....	105	78.9 per cent
Doubtful cures: 3 to 5 negative tests.....	9	19 14.3 per cent
1 to 2 negative tests.....	10	
Doubtful failures: 3 negative tests preceding a positive test with possible reinfection.....	2	3 2.3 per cent
2 negative tests preceding a positive test with possible reinfection.....	1	
Failures: positive test at first to third examination.....	2	1.5 per cent
No tests:.....	4	3.0 per cent
	133	100

Among those listed as cured are two patients who received sulphathiazole as a second treatment and one who received aqueous penicillin as a second treatment after transfer to another institution. The failures are all patients who did not return for treatment after a positive bacteriological examination. The known and doubtful failures combined are 5 cases out of 133 or 3.8 per cent. The 124 cases for whom all tests are negative comprise 93.2 per cent of the total. Excluding all for whom information is incomplete, there are 95.5 per cent cures and 4.5 per cent failures, of which more than half may have been due to reinfection.

Since the required observation period was a minimum of six weeks during which the patients were free to become reinfected, the small percentage of definite cures is not surprising. Van Slyke and Heller (4), summarizing the results for 1,060 cases, also treated with a single dose of 200,000 units, reported 92 per cent cured on a basis of at least 3 negative tests in an observation period of 10 days. Thomas and Meyer (5), for the same dosage in 166 women, reported 84 per cent cured on a basis of 5 negative tests on alternate days. Graham and others (6), using different preparations containing 150,000 units, but with patients hospitalized under supervision for 11 days, obtained similar results (93 per cent cured). For comparison, on a basis of 3 negative bacteriological tests, excluding patients for whom data are incomplete, our results for 118 patients for the single dose are 89.9 per cent cures and 10.1 per cent failures. Similarly for 117 patients, the final result including repeated treatment, is 98.2 per cent cures and 1.8 per cent failures.

No patient in whom the observation period was completed without further exposure required more than two doses for cure.

#### SUMMARY

1. One hundred and thirty-three patients received a total of 156 doses of 200,000 units of penicillin in peanut oil and beeswax.
2. The duration of treatment, as gauged by the presence of 0.025 units of penicillin per cc. of serum, was between 15 and 20 hours.
3. The effectiveness of a single dose and of additional doses was evaluated on a basis of 6 successive negative bacteriological examinations at weekly intervals.

#### ACKNOWLEDGMENT

We wish to express our thanks to Dr. E. Guest, Director of the Special Treatment Clinic, for the opportunity of carrying out this study and for her continued interest and cooperation.

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# The Value of the Wetzel Grid in the Examination of School Children

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OF the numerous methods which have been devised for estimating the physical and nutritional status of school children by the use of physical measurements, one of the simplest procedures is the use of the Wetzel grid (1, 2). For this grid, height, weight and age are used. The grid contains two principal portions. On one of these height and weight are plotted at successive periods. It is claimed that physique or body build, developmental level, and nutritional grade can be determined from each plot of height and weight by reference to special rulings on this portion of the grid. The development level, as determined from height and weight in the first portion of the grid, is plotted against age in the second principal portion. An evaluation of physical progress is made from a consideration of the two curves produced by consecutive plots of observations for each child. Other estimations, such as basal metabolism, can be made from the grid. The simplicity of the technique required in the use of the grid has encouraged its use.

Recently a criticism of the grid has been made by Stuart and Meredith (3). These authors stated: "The curves produced by the plotted measurements on these graphs probably reflect those changes in the various aspects of a child's health and development which the author (Wetzel) claims are revealed by them, but more information than height and weight is required in most instances before the significance of any unusual positions or deviations in these curves can be ascertained. One should therefore be guarded in drawing conclusions from the grid alone."

During a cooperative study on factors which influence the health of school children (4) there was an opportunity to use the Wetzel grid in conjunction with repeated, thorough physical examinations. So far as we are aware there are no published reports as yet regarding the use of the grid for Canadian children. The present one is concerned with status estimations from the grid in comparison with those obtained by physical examination.

## PROCEDURE

The health project in the Hartman Jones Memorial School was commenced in the spring of 1946. Details regarding the school are given in a previous paper (4). Thorough physical examinations were conducted in the spring of 1946 and of 1947. While approximately 550 children were available for these and for

simultaneous nutrition and other studies, records of 359 children were used in the preparation of grids. For this purpose those children were selected who had been in the school for both examinations and who were of such academic grade that they would be likely to remain in the school for several more years (senior students were eliminated as ones who would be fairly sure to leave the school shortly). On this basis grids were prepared for 359 children. Five of these had only one physical examination and the total number of repeated physical examinations available for comparison purposes was 708. In each examination the physician recorded an estimate of the physical status and of the nutrition status of the child, along with other customary data. It should be pointed out that a fairly complete and reliable study of the food habits of each child was made (4).

Three comparisons were made between the grids and the physical examinations: (1) physical status, (2) nutrition status, and (3) change in physical status from 1946 to 1947.

#### RESULTS OF COMPARISONS

Table I gives the comparisons of physical status and of nutrition status as determined from the grid with the estimations made by the examining physician. It should be noted that these comparisons are based on 708 examinations of 359

TABLE I  
COMPARISON OF ESTIMATES OF PHYSICAL AND NUTRITIONAL STATUS FROM  
GRID AND FROM PHYSICAL EXAMINATION

Comparison	Number of Cases	Per cent of Total Number of Cases
<i>Physical Status</i>		
Grid same as physical examination .....	421	59
Grid rating superior .....	110	16
Grid rating inferior .....	177	25
<i>Nutrition Status</i>		
Grid same as physical examination .....	399	56
Grid rating superior .....	121	17
Grid rating inferior .....	188	27

children and that all of the examinations were made by the same physician. There was agreement between the grid evaluation and that of the examiner in slightly over one-half of the cases. Where there was disagreement the grid tended to give a status inferior to that estimated by physical examination.

Table II shows the comparison between changes found by the examining physician and those indicated on grids with regard to physical status. By medical examination 128 children showed a change from 1946 to 1947 (either improvement or regression). For these children, constituting 37 per cent of the entire group, grids showed a similar change for 35 persons only. With regard to change, or lack of it, the total agreement between medical assessment and grid evaluation was 182 persons, 52 per cent of the group. Particular attention should be given

to the comparison for children who would have warranted further observation or treatment. One such instance is the group of 39 children who showed deterioration from one physical examination to the next. Of these 39, the grid showed regression for 10. Reliance upon the grid alone might have caused neglect of the other 29 children.

### DISCUSSION

The comparison results shown in Tables I and II indicate an agreement between the grid and the examining physician of slightly over one-half of the cases studied, whether comparison is made of static positions or of changes. Superficially, this considerable failure to agree might seem to be a severe condemnation of the grid. Perhaps it is, but, on the other hand, it should be made clear that we regard the comparison as somewhat unfair. Determinations of physical status using the grid depend on simple measurements of weight and height and these need have only fair precision for the purpose. When these two

TABLE II  
CHANGES IN PHYSICAL STATUS AS DETERMINED FROM GRIDS AND FROM  
PHYSICAL EXAMINATIONS AT TWO ANNUAL PERIODS

Change Shown by Physical Examination	Change Shown by Grid	Number of Cases
Improvement	Improvement	25
	Regression	8
	No change	56
Regression	Improvement	10
	Regression	10
	No change	19
No change	Improvement	49
	Regression	26
	No change	147

measurements are plotted, the reading of physical status is independent of the opinion of the reader. The grid assessment of physical status is open to little or no subjective error. Evaluation of physical status by physical examination is liable to considerable subjective error since the estimate is dependent upon the judgement of the examiner. The size of this subjective error was described some years ago by Jones (5). A fairer comparison of the two methods of determining either physical status or nutritional status would be to have the physical examinations conducted by a panel, the members of which would record independent opinions. However, the procedure used in the present study is one which operates in most, if not all, schools; examinations would be made by a single physician.

The results given above, while open to the valid criticisms cited in the preceding paragraph, do emphasize the point made by Stuart and Meredith, that the grid should not be relied upon alone but should be used in conjunction with an adequate examination. The chief danger of the grid is derived from the simplicity of its use. The grids prepared in the present study have shown repeated instances of misleading readings which could be obtained unless the grids were interpreted in the light of a physical examination. This is particularly true of cases who have shown marked changes of weight or height, especially of weight. In the present series of children about 10 per cent showed a decrease in development during the year, according to the development portion of the grid. These were children who were too heavy for height (and age) in 1946 and who subsequently "grew out" of the excess weight. The grid classified these children as stocky or obese in 1946 and, generally, normal in 1947. However, the development curve showed "advanced" development at the first examination and more normal at the second. It is an unfortunate aspect of the grid that it frequently shows a child to have "advanced" development when the actual situation is one of overweight.

The limited experience with the grid in the present study leads to the opinion that too much reliance is placed upon weight and height. Obviously, these two measurements can be used to determine obesity or underweight but it seems doubtful that an estimate of nutritional status can be made from height, weight, and age only. It is not likely, either, that these measurements can be used as criteria of health. There is a prevalent viewpoint that to-day's children are taller and heavier than those of the last generation and *consequently* healthier. Actually, there is no assurance that a child is healthier because he is tall and of a normal weight for that height. The development portion of the grid could be interpreted as conforming to the popular opinion.

In using the grid for Canadian children it seemed useful to see how recent information regarding height and weight of such children would conform to the grid. Data from a large Toronto study were used (6). Average weights and heights for boys and girls were plotted separately and the developmental levels were plotted against age. In the case of girls those of five years of age were on the heavy side of "normal". Other data for girls up to and including age 15 were approximately "normal"; the development curve fitted the "normal" curve reasonably well. The averages for Toronto boys were somewhat different. Here again, those of five were on the heavy side of "normal". Plots of height and weight for all older ages were in the "good" channel but the plotted development curve did not fit the "normal" one on the grid as well as in the case of the girls. Up to age 13 the boys' development line lay slightly above the "normal" one. For ages 14 and 15 the development would be read as somewhat retarded. To bring the average for boys aged 15 to "normal" would require an increase in height of  $1\frac{1}{2}$  inches and in weight of 10 pounds. These are appreciable increases and the question may be raised as to whether the grid is reliable for boys of 15 or whether the average Toronto boy of that age is underdeveloped.

The grid may be useful in giving a graphic picture of changes in weight and height, more easily comprehended than inspection of the data. It shows changes



to obesity or to underweight. In the present study the grid evaluation corresponded poorly to that obtained by medical examination but this criticism of the grid is open to question. The grid could be advantageous in school medical services to give a visual representation of changes but should not be used separately from physical examination.

#### SUMMARY

Wetzel grids were prepared for 359 elementary school children on all but five of whom two medical examinations had been conducted one year apart. Comparison of grid readings for physical and for nutritional status with estimates made by the examining physician showed an agreement in slightly over one-half of the cases. Similar agreement was obtained when changes from one year to the next were evaluated by the physician and from the grid. While such comparisons are open to valid criticism, it is believed that the use of the grid places too much reliance upon weight and height for age. The grid is simple to use but interpretations from it can be misleading and the grid should be employed in conjunction with an adequate physical examination.

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## Proposed Report on the Educational Qualifications of Public Health Engineers

THE Executive Council of the Canadian Public Health Association has given preliminary approval to the following proposed Report on the Educational Qualifications of Public Health Engineers. This is the third of a series of reports of the Committee on Professional Education. This committee felt that the existing reports of the American Public Health Association on the qualifications and requirements of various types of individual engaged in public health had been prepared with such care and mature deliberation that it would be a duplication of effort to start anew in formulating similar Canadian reports. Consequently, the American Public Health Association reports have been adapted as *proposed* reports for Canadian use, with the approval of the American Public Health Association.

The Executive Council approved a system whereby the reports would be published in the JOURNAL as proposed reports and would be open to criticism for a period of approximately eight months, after which time they would be rewritten to include any constructive criticisms received by the committee. The revised report will then be submitted to the Executive Council for final approval, following which it will be re-published in the JOURNAL.

This series of reports will be subject to constant revision over the years in order to keep them up to date with the changing picture in public health.

Members wishing to offer criticism or suggestions should address them to the Chairman of the Committee on Professional Education, Canadian Public Health Association, 150 College Street, Toronto 5.

The term "public health engineer" as used in this report refers to the sanitary engineer, employed by a public health agency, who is trained in methods for the control and proper use of factors of the environment to the end that the public health is improved or protected.

The term "public health engineering" as used in this report includes the public health aspects of all types of environmental conditions whose control is based upon engineering principles. All procedures of public health agencies that depend upon engineering materials or methods for environmental conditions should be considered as public health engineering activities.

### I. GENERAL SCOPE OF ENGINEERS IN PUBLIC HEALTH PROGRAMS

The practice of public health engineering includes not only the activities of engineers in official health agencies in their investigations, review of plans, and supervision of the operation of sanitary works, but also the functions of engineers in private practice or in government organizations other than health agencies in the design, operation and control of sanitary works. In order to be qualified to review plans and supervise operations, therefore, the public health engineer must be trained and qualified not only to advise on problems of sanitation, but also to design and construct sanitary works.

Public health activities may be divided into two distinct but closely inter-related fields, one having to do with the human element and the other with the environment. The first is normally the field of the physician and the nurse, while

the second is that of the engineer and other sanitation personnel. There is no distinct separation between these activities, but there is a middle ground in which the activities of the physician and engineer merge. Therefore, successful operation of a public health program demands administrative participation and careful planning by both physician and engineer.

It is recommended that a population unit of 50,000 or more requires the services of at least one public health engineer plus an adequate number of assistants. Only by the establishment of high professional standards, with a corresponding increase in salaries, can the required number of competent persons be obtained and their services retained.

## II. THE ACTIVITIES AND FUNCTIONS OF ENGINEERS IN PUBLIC HEALTH

One of the major activities of public health engineers is that of supervising the development and operation of sanitary works in order to control properly those aspects that may affect the public health. The engineering procedures involved and the place of the public health engineer in the supervision, development and operation of such works are:

- (a) Investigating and planning.
- (b) Designing and preparing specifications.
- (c) Construction.
- (d) Maintenance and operation.

Except as discussed later, the design and construction of sanitary works is commonly assigned to engineers in private or consulting practice and to public engineering organizations developed for this specific purpose. The maintenance and operation of the structures is then generally taken over by existing or specially organized departments or appropriate political subdivisions.

The proper development and operation of sanitary works are matters of public concern in general and of public health in particular. Since profit or other economic motives are often associated with the development and operation of sanitary works, and since there may be a conflict of interest between different regions, communities, or industries and their sanitary needs, supervision and regulation is placed in governmental agencies including the engineering subdivision of health departments. Briefly, those organizations are entrusted with the following activities:

- (e) Investigation of sanitary needs, and stimulation to provide necessary remedial measures.
- (f) Advice relative to and approval of proposed works and approval of contemplated works.
- (g) Supervision of operation and maintenance of existing works.
- (h) Development and enforcement of rules and regulations.

Procedures (e) to (h) are complementary to the fundamental engineering procedures involved in the development and operation of sanitary works procedures (a) to (d) and have been interpolated for the purpose of establishing a reasonable system of checks and balances in the interest of health and welfare. Competently to fulfil procedures (e) to (h) the responsible engineer must possess the fundamental qualifications required for procedures (a) to (d) as well

as additional qualifications related to the public health and welfare aspects of these activities.

Public health engineering includes not only supervision of the development and operation of sanitary works as outlined above, but also participation in the planning, design, construction, operation and maintenance of other physical elements that contribute to the support of community life so that the protection and promotion of public health can be assured. Some of these other physical elements are: dwellings; structures, and equipment used to produce, process and distribute the food supply; environmental conditions which support disease-bearing insects and rodent life, and the growth of noxious weeds; industrial structures and equipment with special reference to the effect on the air breathed in such industries as well as the other physical hazards, therein.

The following are listed as public health engineering activities, as now carried on:

1. Water supply and treatment, design and installation of sewers, sewage and industrial waste disposal; stream pollution control; bathing place control; and mosquito control measures.
2. Municipal and rural waste disposal and insect, rodent, vermin and weed control.
3. Food sanitation, including the production and pasteurization of milk and the manufacture of ice cream and other dairy products; the sanitary production of shellfish and the production, storage and distribution of meat, poultry, pastry, bakery goods, fish, and other foods as well as the sanitation of eating and drinking establishments.
4. The sanitation of schools, camps, public places, swimming pools and recreational areas.
5. Programs to promote healthful housing for all people.
6. Industrial hygiene and sanitation. This involves those special engineering problems incident to industrial processes and includes the many features of environmental sanitation. Industrial sanitation should therefore be under the direction of a public health engineer.
7. In cities particularly, proper city planning, heating, lighting and ventilation of buildings, plumbing, aerial pollution and noise. These problems are largely engineering in character. Any program to influence them in the benefit of public health must be based on engineering investigations and solutions.

### III. THE EDUCATIONAL BACKGROUND OF PUBLIC HEALTH ENGINEERS

Public health engineers must possess two distinct and essential educational qualifications: (a) basic education and training in engineering, and (b) specialized knowledge and ability in sanitary science, sanitary engineering and public health.

#### *A. Basic Engineering Education*

The public health engineer should be a graduate of a full four-year or longer course leading to a bachelor's or higher degree\* at a college or university of recognized standing with the major study and the basis of the degree in a course such as sanitary or public health engineering, or the sanitary option in civil engineering. In the case of public health engineers entering industrial sanitation, mechanical or chemical engineering is preferred. In so far as the academic requirements are concerned, the basic education of the engineer should make him eligible for admission to examination for licensure to practise professional engineering in the province of his employment.

#### *B. Specialized Education and Training*

The varied functions of a public health engineer necessitate additional education beyond that ordinarily acquired by basic training in engineering. Successful performance in his field requires: (a) an intimate and working knowledge of the physical, chemical, biological and engineering sciences upon which the sanitary control of the environment is based and (b) the ability to identify, evaluate, and explain in terms of their public health implications those environmental factors that will promote and protect health or those that are capable of injuring health. This specialized knowledge lies mainly in three fields: (1) sanitary science, (2) sanitary engineering, and (3) public health. The elements of these are indicated in the outline of graduate education, Section IV.

The program of study preparing for a career in public health engineering falls into three categories:

1. **SANITARY OPTIONS IN FOUR-YEAR UNDERGRADUATE CURRICULA OF CIVIL ENGINEERING.** In 1944 twenty-three such curricula remained accredited by the Engineers' Council for Professional Development. The accredited options, for which information is available, allotted from 8 to 20 per cent of the period of study to the subjects of primary importance to sanitary engineers; namely, chemistry (beyond freshman chemistry), biology (including bacteriology), hydrology or hydraulic engineering, sanitary engineering, and public health. There are no sanitary options in chemical and mechanical engineering, those most closely allied to industrial hygiene.
2. **FOUR-YEAR UNDERGRADUATE CURRICULA IN SANITARY ENGINEERING.** In 1944 three such curricula remained accredited by the Engineers' Council for Professional Development. One of these three accredited

\*In making this recommendation the Canadian Public Health Association expressly recognizes that there are many persons now actively engaged in public health work who are lacking in formal education but whose training or experience should be accepted as fully equivalent to the basic engineering education defined above. The basis of substitution shall be at least two years of appropriate training or experience equivalent to one year of formal engineering education. Such persons who have such sufficient equivalent training or experience to substitute for the accredited engineering education they lack shall be considered professional engineers for the purpose of this report.

curricula had been discontinued by its institution. Registration for programs of this type has long been very low and the outlook for a continuation of these programs is uncertain. The accredited curricula allotted from 13 to 25 per cent of the period of study to the subjects of primary importance to sanitary engineers (see 1 above). None of these curricula is oriented particularly toward the practice of industrial hygiene.

3. GRADUATE CURRICULA IN SANITARY ENGINEERING AND PUBLIC HEALTH. These include two general types of programs, those in which the major study and graduate degree are in sanitary engineering and those in which the major study and degree are in public health. Such programs provide opportunities for engineers with little or no training in public health engineering to develop a sufficient background to begin work in public health. They also provide advanced graduate instruction for those who have completed undergraduate programs in sanitary options or sanitary engineering. Either of the two types of program should be accepted as satisfactory for these purposes if they include adequate instruction in each of the three essential fields of knowledge previously outlined and enough choice of electives to meet the needs of students with varying backgrounds of previous training and experience. As yet there are not accrediting agencies that examine and accredit graduate curricula in sanitary or public health engineering. As a minimum for initial employment as a public health engineer the graduate engineer should have completed an approved undergraduate sanitary option or sanitary engineering program; or, in addition to graduation in engineering, should have received an equivalent amount and similar character of approved post-graduate education or in-service training. Such post-graduate training can best be obtained through study in an approved educational institution but may be provided by post-graduate self-education or in-service training during a period of probationary employment under competent public health engineering supervision. A young engineer, at first occupied in a subordinate position, should work under close public health engineering supervision until he has prepared himself by experience or graduate duty for positions of major responsibility. Graduate education affords the greatest assurance that the public health engineer will become both broadly competent and well grounded in the subjects that are fundamental to sanitary progress.

#### IV. GRADUATE EDUCATION

The true value of the public health engineer rests squarely on his ability within his professional field.

Because of the wide difference in the technical knowledge required in the various fields of public health engineering activity, opportunity should be afforded for some specialization. Depending upon the student's preparation, a suitable program of graduate study should be developed from the following elements of sanitary science, engineering technology, and public health practice.



- a. Sanitary sciences including (but not limited to) : bacteriology, chemistry, parasitology, planktology, entomology and human physiology as related to problems of public health engineering interest.
- b. The principles and practices of engineering analysis, design and operation as applied to works and projects for the protection and promotion of the public health including (but not limited to) the following : water supply and purification, sewerage and sewage treatment, the collection and disposal of municipal, rural and industrial wastes ; projects for the control of insect, rodent and other vectors of disease transmission ; the engineering and administration phases of food and milk sanitation ; the sanitation of buildings including ventilation, air conditioning, heating, plumbing, and illumination ; housing ; industrial sanitation with particular reference to those industrial health hazards the correction of which is largely an engineering problem.
- c. The principles of public health including (but not limited to) the following : public health administration sufficient to give to the student a clear understanding of the purposes, functions and legal bases of the general public health program and the responsibilities of the engineer within that program ; epidemiology and communicable disease control ; statistical methods in sanitary engineering and public health practice.

The type of institution best fitted to give the instruction is a university which includes both a faculty of engineering and a faculty of public health, and in which close co-operation is maintained between the members of the two faculties who are responsible for instruction in public health engineering.

#### V. CLASSIFICATION OF PUBLIC HEALTH ENGINEERS

In an organization having a staff of engineers, classification is necessary. In general, such classification automatically occurs and it is a general requirement under usual civil service procedures. However, lack of uniformity in classification exists among the various health agencies employing engineers. The following classification with educational and experience requirements is suggested.

The education, training and experience stated in the classification should be regarded as the minimum that is normally acceptable. It is not intended that the qualifications should be retroactive but rather that they should apply to the selection of new employees and serve as a guide in the future advancement of sanitary engineering personnel.

Because of the present limited supply of qualified public health engineers, it is proposed that in any grade, three years of acceptable experience in public health engineering under competent supervision may be substituted for the one year of graduate study set forth in this report. However, the advantages of specialized graduate study in the sound and early development of public health engineers for positions of responsibility are recognized. Therefore, as soon as practicable, at least one academic year of approved graduate study as described in Section IV should be made a basic requirement for appointment or promotion to Grade III or to higher grades in this classification.

### *Education and Experience*

The minimum educational requirements for all grades are: (1) graduation in engineering from a college or university of recognized standing; (2) satisfaction of academic requirements for admission to examination for licensure to practise engineering in the particular province; and (3) completion of an approved undergraduate sanitary option or sanitary engineering program or, lacking such training, an equivalent amount of postgraduate orientation. Such postgraduate training may consist of at least three months of approved university guidance; or a like period of well-rounded and systematic in-service orientation and supervised practice. Tentative or provisional appointments may be authorized for graduate engineers without public health engineering training or experience to allow a sufficient period for graduate study or in-service training to qualify them for permanent classification.

With the exception of Grades I and II, specialized education should include, in addition to the minimum educational requirements, at least one academic year of graduate study in a recognized institution of learning leading to a graduate degree and with major study in sanitary science, sanitary engineering, and public health. In lieu of a year of graduate study, three years of suitable practice under the supervision of a competent public health engineer in public health work may be substituted provided that (1) such substitutions of experience for graduate study normally should not be allowed for grades higher than Grade III, and (2) a sanitary engineer who later completes a year or more of graduate study should receive equivalent credit in his classification for the years of experience previously substituted in lieu of graduate study.

Attainment of the doctor's degree in sanitary engineering or in public health if based on special duties in the field of public health engineering in a school of recognized standing should be considered as the equivalent of and may be substituted for a part of the experience requirements of the classification below as follows: Grade III—one year; Grade IV—two years; and Grade V—three years.

### *Classification*

The qualifications for each grade should conform with the educational requirements or equivalent experience as described above in addition to the experience indicated below:

Grade I—No experience required.

Grade II—At least one year of suitable experience in sanitary engineering work under competent supervision.

Grade III—At least two years of suitable experience in sanitary engineering work in a grade comparable to Grade II, of which at least one year of the total experience must be in public health work. (Total 3 years' sanitary engineering, 1 of them in a public health agency.)

Grade IV—At least two years of sanitary engineering experience in a grade comparable to Grade III, of which at least two years of the total experience must be in a responsible position in public health work. (Total 5 years' sanitary engineering, 3 of them in a public health agency.)

Grade V—At least five years of engineering experience in a grade comparable to Grade IV, of which at least five years of the total experience must be in a responsible position in public health work. (Total 10 years' sanitary engineering, 5 of them in a public health agency.)

#### *Personal Qualities*

To attain success in full measure, public health engineers should not only be competent in their field of learning and practice but should also be able to establish and maintain favourable relations in their own department and with the public on the basis of creative ability, far-sighted leadership, sound engineering judgment, common sense, honesty and industry.

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## NOTICE

### MEMBERSHIP IN THE CANADIAN PUBLIC HEALTH ASSOCIATION

By action of the Executive Council at the annual meeting in Quebec City, 1947, the membership dues have been raised to \$5.00 per annum, commencing January 1, 1948. This fee includes full membership privileges and a year's subscription for the Canadian Journal of Public Health.

Persons who receive a subscription for the Journal through the good graces of their Provincial Government may become members of the Association by the payment of \$2.00, which is the difference between the subscription rate to the Provincial Government and the \$5.00 membership fee.

# Canadian Journal of Public Health

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## PROGRESS IN INTERNATIONAL VITAL STATISTICS

THE convening of the Second Session of the International Committee for the Preparation of the Sixth Revision of International Lists of Diseases and Causes of Death in Geneva during this month not only marks a further important step in the continuation of international participation in vital statistics, in connection with causes-of-death statistics, but also gives promise of the successful introduction of a classification of diseases to make possible comparable morbidity statistics from all the participating countries. The conference will consider the recommendations which may be presented by all the countries following their consideration of the findings of the First Session, held in Ottawa last March in conjunction with the United States Joint Committee on Causes of Death. It is anticipated that both the recommendations relating to the Sixth Revision of the List of Causes of Death and to the First International List of Causes of Morbidity will be finally approved by the international conference to be convened in Paris next year.

Canada is represented on the International Committee by Dr. John Wyllie, Professor of Preventive Medicine, Queen's University, and by Mr. J. T. Marshall, Assistant Dominion Statistician, who is co-secretary of the Committee. Other Canadians taking part in the Ottawa meeting were Dr. F. S. Burke and Dr. J. C. Meakins, who are members of the United States Committee on Joint Causes of Death, and the Technical Adviser to the Canadian delegation, Miss Winifred O'Brien, R.N., of the Dominion Bureau of Statistics. The Ottawa meeting was the first occasion when the International Committee has met in Canada, and pleasure at the success of the sessions has been expressed in several international journals.

The revision now being made is the sixth since the introduction of the List in 1893. It will be recalled that the first List was prepared by Dr. Jacques Bertillon of Paris, and the Bertillon classification was adopted by various countries. In 1898 the American Public Health Association, meeting in Ottawa, recommended the adoption of the classification by the registrars of the United States, Mexico, and Canada, and proposed that the classification be revised every ten years. In the following year the International Statistical Institute,

meeting at Christiana, adopted the proposal to revise the classification every ten years. The first revision was made in 1900, when twenty-six nations were represented at a conference called by the French Government, in Paris. Later, an international commission was established with representatives from the International Statistical Institute and the Health Organization of the League of Nations, and this commission arranged for the fourth revision (1929) and the fifth revision (1938).

The need for a morbidity classification was recognized many years ago by Farr, who, at the second meeting of the International Statistical Congress in 1855, presented a list of diseases "which affect health as well as the diseases that are fatal." Classifications of illness which, for the most part, paralleled the International List of Causes of Death, were adopted by successive international congresses, but these classifications of illness failed to receive general acceptance. A number of countries found it expedient to prepare lists, and it is of interest that in 1934 Dr. F. S. Burke, of the Department of Pensions and National Health, commenced his investigations on morbidity in the Civil Service of Canada and developed, in collaboration with the Dominion Bureau of Statistics, a statistical classification of diseases based upon the structure of the International List of Causes of Death. The evolution of this classification along the lines of the International List was stimulated by studies which were undertaken by Dr. Burke in 1936 of the death and illness records of World War I pensioners. This latter study embraced the concept of morbidity as well as mortality and provided the first application in Canada of a single statistical classification serving both purposes. For his original contribution in the field of morbidity statistics, Dr. Burke was awarded the medal of the Professional Institute of the Civil Service of Canada. In 1936 the classification was adopted in modified form by the Dominion Council of Health as the "Standard Morbidity Code for Canada." In 1937 Mr. J. T. Marshall, then Inspector of Vital Statistics for the Province of British Columbia, prepared an alphabetical index to the Code which greatly extended its usefulness. With the outbreak of war in 1939, the Standard Morbidity Code for Canada, with some adjustments to meet training and combat medical statistical requirements, was adopted by the medical services of the armed forces and the Canadian Pensions Commission. Later, provisional classifications of disease and injuries were published in Britain and the United States for use in the tabulation of morbidity statistics. Both classifications were more extensive than the Canadian list. In preparation for the forthcoming revision, a United States Committee on Joint Causes of Death, which included also four members and a technical adviser from Canada, was appointed to prepare recommendations for the International Committee.

The progress made has been highly satisfactory, and the Second Session of the International Committee which is being held this month will have before it not only the list of categories in connection with the morbidity classification but also the tabular list of inclusions and an alphabetical index (tentative edition) to the disease entities. The task of setting up the index, a tremendous undertaking in itself, was assigned to a small committee consisting of Dr. S. D. Collins and Dr. Iwao Moriyama from the United States, and Mr. J. T. Marshall

and Miss Winifred O'Brien from Canada. This committee has rendered invaluable service.

Of outstanding success and promise in the work of the United Nations is the World Health Organization. In the promotion of health and the prevention of disease the nations are united in a common endeavour. International vital statistics are fundamental to the progress of world health. The introduction of an international morbidity code not only is one of the most important advances in vital statistics but is fundamental to all health programs.

*The  
Canadian Public Health Association*

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*Thirty-sixth Annual Meeting*

HOTEL VANCOUVER, VANCOUVER, B.C.

MAY 18-20, 1948



*Executive Council Meeting May 17*



## BOOKS

**Nursing and Nursing Education.** By Agnes Gelinas, R.N., A.M. *Studies of the New York Academy of Medicine Committee on Medicine and the Changing Order.* New York: The Commonwealth Fund, 1946. 84 pages. \$1.00.

THIS is one of the series of monographs which have been written by various experts in medical fields under the auspices of the Committee on Medicine and the Changing Order of the New York Academy of Medicine. The series is part of the Committee's study of the effect of present social and economic conditions on the various fields of medicine as a whole.

The book describes briefly the historical development of nursing, and then goes on to survey the shortages which the war made more acute. Personnel policies which help in obtaining and holding well-qualified nurses and in improving standards are then discussed. But important though these are, the writer emphasizes that the basic requirement for good nursing is sound education; and that reform in service is dependent on reform in education. The public must be made more conscious of this relation.

The most important chapter is that called "Nursing Education—Problems and Recommendations." The purpose of the basic nursing program is stated as being "to prepare the student for generalized nursing service—in homes, institutions, and public health agencies"; and in addition, to develop her as an individual and as a citizen. To do this, "liberal arts courses, social and recreational opportunities, health care and physical education, and participation in the government of the school" must have a place in the plan.

The core of the problem of nursing education is the organization of the usual, or hospital, school of nursing. We cannot concur in the author's statement that "some hospital schools of nursing are providing sound preparation for their students." The hospital school, as at present organized and subsidized (or not subsidized), does not and cannot provide a sound preparation for nursing. This must be fully faced. Too much

time and energy have been spent trying to bolster up this old unworkable plan. Indeed, the writer goes on to say, "In most instances, hospitals, as service agencies, find it difficult to meet the expenses of nursing service unless they use a large number of hours of nursing service. Consequently, their students are overworked and have too few hours of instruction and too many hours of non-educational service . . . until special provision is made for the financing of a broad educational program, schools of nursing will be unable to provide adequately trained nurses." She suggests that this support could come in part from student fees and through reimbursement to the school for student practice; the remainder would have to come from either private or public funds. "Hospitals should not be expected to support schools of nursing any more than the schools should help support the hospitals."

The curricula of both the hospital and the university school of nursing are briefly outlined; and the need for support of advanced education to prepare teachers and administrators is emphasized. The book concludes with an estimate of supply and demand in the immediate future, and a plan for study and action in nursing.

This book is a concise survey of the main problems in nursing service and nursing education, in line with recognized current thinking on the subject; and though it discusses conditions only in the United States, it should be useful to Canadian readers also.

N. D. Fidler

**Medical Services by Government.** By Bernhard J. Stern, Ph.D. *Studies of the New York Academy of Medicine Committee on Medicine and the Changing Order.* New York: The Commonwealth Fund, 1946. 208 pages. \$1.50.

THIS monograph by Dr. Stern on "Medical Services by Government" is one of a series which forms an integral part of the Studies of the Committee on Medicine and the Changing Order established by the Council of the New York Academy of Medicine in 1942.

The stated objective of this book is to present "an inventory in historical perspectives, of medical services now being provided directly and indirectly by government agencies on all levels, local, state and federal". While a "proper historical perspective" may not be essential to the consideration and formulation of plans for adequate medical care of the population, we must admit that it is advantageous. To the end, Dr. Stern's book performs a useful function as an introduction to the study of medical care. It brings together in convenient form a concise summary of the developments of government interest and participation in and responsibility for health and medical care at each level. No attempt is made at analysis or evaluation of current programs or policies.

The chapter-by-chapter bibliographies will be most useful to students of the medical-care problem.

A. H. Sellers

#### **Dentistry—An Agency of Health Service.**

By Malcolm Wallace Carr, D.D.S. *Studies of the New York Academy of Medicine Committee on Medicine and the Changing Order.* New York: The Commonwealth Fund, 1946. 219 pages. \$1.50.

THE fact that this book on dentistry has been sponsored and subsidized by the New York Academy of Medicine, through its Committee on Medicine and the Changing Order, gives recognition to dentistry's place in the health field and assumes that the profession of dentistry, through its teaching and practice, is qualifying itself to accept its responsibilities in that field.

The book covers a history of dentistry on this continent, from its beginning, and records its progress up to the present time. The author has performed his task splendidly, and throughout has used a style which should make the book of interest to the intelligent layman, the dentist, the physician, and all health workers. The material is factual and not pedagogic, more in the form of a narrative,

thus maintaining the interest of the reader from beginning to end.

"The general objective of this volume, and of the series in which it appears, is the theme of national health in a changing social order. Both dentistry and medicine must exert their leadership even in the social and economic aspects of the problem."

This book will be valuable to those who are interested in the many projected schemes of socialized health services. It is not a bulky book, but quite comprehensive, covering its subject in few, well-chosen words, with chapters on History, Education, Dental Practice, and Social Economics, and a Summary and Conclusions. It is recommended to all public health workers, dentists and lay groups who are studying public health.

Harry S. Thomson

#### **BOOKS RECEIVED**

*The School Administrator, Physician, and Nurse in the School Health Program.* A report composed by the National Conference for Co-operation in Health Education and published by the Metropolitan Life Insurance Company as School Health Monograph No. 13. 56 pages.

*12 American Health Heroes.* Volumes XV, XVI, and XVII of the Health Bulletin for Teachers, 1943-1946. Published by the School Health Bureau, Health and Welfare Division, Metropolitan Life Insurance Company, New York, 1947. 56 pages.

*The American Hospital.* By E. H. L. Corwin, Ph.D. New York Academy of Medicine Committee on Medicine and the Changing Order. New York: The Commonwealth Fund, 1947. 228 pages. \$1.50.

*Fungi.* An introduction to fungi, stressing their structure, classification, activities, and natural economy. By Frederick A. Wolf and Frederick T. Wolf. New York: John Wiley & Sons, Inc., 1947. Volumes I and II. \$6.00 each.

*Insect Pests.* By Wm. Clunie Harvey and Harry Hill. 2nd ed., 1947. London: H. K. Lewis & Co. Ltd. 347 pages. 14s. net.

*Your Community, Its Provision for Health, Education, Safety, Welfare.* By Joanna C. Colcord. New York: Russell Sage Foundation, 1947. 263 pages. \$1.50.

